

U.S. Department of Energy Boiler MACT Technical Assistance Program

Combined Heat and Power A Technical & Economic Compliance Strategy

June 11th, 2013

Alabama Summit on Industrial Energy Efficiency
DOE Southeast Clean Energy Application Center



U.S. DEPARTMENT OF ENERGY
Southeast Clean Energy Application Center

Promoting CHP, District Energy, and Waste Heat Recovery

Presentation Message / Take Away

- DOE currently (through its 8 regional Clean Energy Application Centers – CEACs) provides:
 - technical information and assistance
 - market development, and
 - education on Conventional CHP, Waste Heat to Power, and District Energy CHP options
- DOE, through the CEAC network, is supplementing this ongoing effort by providing site-specific technical and cost information on clean energy compliance strategies to those major source facilities affected by the Boiler MACT rule currently burning coal or oil.
- These affected facilities may have opportunities to develop compliance strategies, such as CHP, that are cleaner, more energy efficient, and that can have a positive economic return for the plant over time.



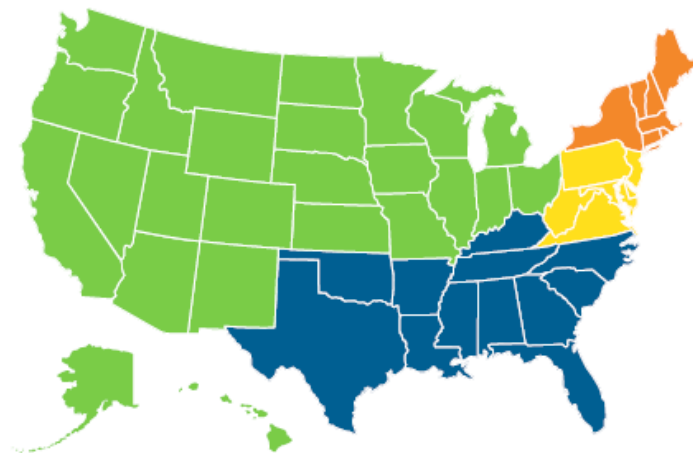
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Presentation Message / Take Away

- Take advantage of the DOE Boiler MACT Technical Assistance Program (Decision Tree Analysis):
<http://www.1.eere.energy.gov/manufacturing/distributedenergy/boilermact.html>



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ADVANCED MANUFACTURING OFFICE

Boiler MACT Technical Assistance

Overview

On December 20, 2012, the U.S. Environmental Protection Agency (EPA) finalized the reconsideration process for its Clean Air Act pollution standards National Emissions Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters (known as Boiler Maximum Achievable Control Technology (MACT)). This rule applies to large and small boilers in a wide range of industrial facilities and institutions. The U.S. Department

stated in the final rule that existing sources will have 3 years from issuance of the final reconsideration rule to implement the new requirements, and if needed, may request an additional year.

Expected Impact on Facilities and Institutions

EPA estimates that less than 1 percent of the 1.5 million boilers in the United States would need to meet emissions limits under the reconsidered rules. EPA estimates that about 183,000 are

approximately 12 percent (about 1,650 boilers) primarily fired by coal, oil and biomass, will be required to meet specific emissions limits. These boilers using coal or oil may consider switching to natural gas as a compliance strategy and may consider natural gas combined heat and power.

Resources

"Financial Incentives Available for Facilities that are Affected by the



Financial Incentives Available for Facilities that are Affected by the US EPA "National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters; Proposed Rule"

December 2012



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Decision Tree Analysis

Cash Flow Projections	Upgrade Coal Boilers	New Natural Gas Boilers	Boiler Conversion to Natural Gas	Natural Gas CHP
Capital Costs	\$1,308,263	\$10,288,679	\$4,627,704	\$63,858,447
5 YR Annual Fuel Cost	\$22,108,091	\$58,787,424	\$67,185,627	\$136,036,404
5 YR Annual O&M Cost	\$29,946,414	\$12,443,338	\$14,220,958	\$27,197,829
5 YR Annual Compliance O&M	\$1,176,563	\$0	\$0	\$0
5 YR Annual Electric Savings	\$0	\$0	\$0	(\$143,856,284)
5 YR Net Cash Flow (Output)	\$54,539,331	\$81,519,440	\$86,034,289	\$83,236,396
Capital Costs	\$1,308,263	\$10,288,679	\$4,627,704	\$63,858,447
10 YR Annual Fuel Cost	\$47,737,428	\$126,938,160	\$145,072,183	\$293,739,880
10 YR Annual O&M Cost	\$64,662,516	\$26,868,577	\$30,706,945	\$58,727,566
10 YR Annual Compliance O&M	\$2,540,522	\$0	\$0	\$0
10 YR Annual Electric Savings	\$0	\$0	\$0	(\$310,625,144)
10 YR Net Cash Flow (Output)	\$116,248,728	\$164,095,416	\$180,406,832	\$105,700,749
10 YR IRR - Natural Gas CHP vs Coal Compliance Baseline Case				3%
10 Yr NPV - Natural Gas CHP vs Coal Compliance Baseline Case				(\$16,960,682.79)



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Affected Facilities by Technical Assistance CEAC Region

CEAC Region for Technical Assistance	Number of Facilities	Number of Coal Units	Number of Heavy Oil Units	Number of Light Oil Units
Mid-Atlantic	109	150	67	43
Midwest	232	377	100	82
Northeast	58	22	88	26
Southeast	177	225	114	90
Total	567	774	369	241

- Facilities are categorized by the CEAC region conducting their technical assistance, not their actual location
- This table includes only industrial/commercial/institutional boilers



DOE Boiler MACT Technical Assistance Program (Southeast)

The U.S. DOE Southeast CEAC is supplementing its normal CHP services by:

- Providing site specific technical and cost information to the 177 major source facilities (~ 429 boilers) in 12 states currently burning coal or oil (Decision Tree Analysis)
- Meeting with willing individual facility management to discuss “Clean Energy Compliance Strategies” including potential funding and financial opportunities.
- Assisting interested facilities in the implementation of CHP as a compliance strategy



Decision Tree

- Provides available data:
 - General Site information
 - Boiler information/configuration
 - Compliance and conversion cost estimates
- Calculations
 - Average Steam Load
 - CHP Sizing
 - CHP Paybacks compared to other options
 - 5 and 10 year cash flows
 - IRR and NPV

[illegible]

Cash Flows, IRR, NPV

- 5 and 10 year cash flows are calculated for each compliance option
- The 10 year internal rate of return (IRR) and net present value (NPV) are calculated for CHP versus installing compliance controls

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Current Status¹

- **Sites Contacted**
 - **AL – 55%**
 - **SE – 58%**
 - **Sites Remaining**
 - **AL – 8**
 - **SE – 74**
 - **Complete***
 - **AL – 28%**
 - **SE – 47%**
- *Complete: Plant closed, have switched to natural gas or biomass, analysis complete or declined support



Boiler MACT Assistance / Information

- List of available state incentives for emissions controls, energy efficiency measures, boiler replacements/tune-ups, CHP, and energy assessments (DOE)
 - http://www1.eere.energy.gov/industry/states/pdfs/incentives_boiler_mact.pdf
- Extensive assistance materials for Area Source rule available from EPA
 - Tune-up guidance, fast facts, brochure, table of requirements, small entity compliance guide, etc.
 - www.epa.gov/ttn/atw/boiler/boilerpg.html
- DOE technical assistance for Major Source rule
 - Site-specific technical and cost information for evaluation of clean energy compliance options for facilities with coal/oil-fired boilers through Regional Clean Energy Application Centers. Includes site visits.
 - <http://www1.eere.energy.gov/manufacturing/distributedenergy/boilermact.html>



DOE & Southeast CEAC Contacts

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States Covered: Arkansas, Alabama, Florida,
Georgia, Kentucky, Mississippi, North
Carolina, South Carolina & Tennessee +
Louisiana, Oklahoma, Texas
(Boiler MACT TA Only)



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Thank You!



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